

What is claimed is:

1. A method of inhibiting the growth and cell cycle progression of carcinoma cells comprising the step of contacting the cells with an anthocyanin-rich extract from  
5 in an amount effective to inhibit the growth and cell cycle progression of the carcinoma cells without effecting the growth and cell cycle progression of normal cells.
2. The method of claim 1, wherein the carcinoma cells are colon carcinoma cells.  
10
3. The method of claim 1, wherein the anthocyanin-rich extract is from chokeberries, bilberries, grapes or combinations thereof.
4. A method of inhibiting the growth and cell cycle progression of carcinoma cells comprising contacting the carcinoma cells with an anthocyanin-rich extract in an  
15 amount effect to down regulate Cox 2 gene expression in carcinoma cells without effecting Cox 1 or Cox 2 gene expression in normal cells.
5. The method of claim 4, wherein the anthocyanin-rich extract is derived from  
20 bilberries, grapes or combinations thereof.
6. The method of claim 4, wherein the carcinoma cells are colon carcinoma cells.
7. A method of inhibiting the growth and cell cycle progression of carcinoma cells comprising contacting the carcinoma cells with an anthocyanin-rich extract in an  
25 amount effective to up regulate the gene expression of p21<sup>WAF1</sup> and p27<sup>KIP1</sup> in carcinoma cells without effecting p21<sup>WAF1</sup> and p27<sup>KIP1</sup> gene expression in normal cells.

8. The method of claim 7, wherein the carcinoma cells are colon carcinoma cells.
9. The method of claim 7, wherein the anthocyanin-rich extract is derived from chokeberries.
- 5 10. A method of inhibiting the growth and cell cycle progression of carcinoma cells comprising contacting the carcinoma cells with an anthocyanin-rich extract in an amount effective to cause dual blockage of cell cycle progression at both the G<sub>1</sub>/G<sub>0</sub> and G<sub>2</sub>/M phases of the cell cycle without effecting the cell cycle  
10 progression in normal cells.
11. The method of claim 10, wherein the carcinoma cells are colon carcinoma cells.
12. The method of claim 10, wherein the anthocyanin-rich extract is derived from  
15 chokeberries.
13. A method of inhibiting the growth and cell cycle progression of carcinoma cells comprising contacting the carcinoma cells with an anthocyanin-rich extract in an amount effective to down regulate the gene expression of cyclin A and  
20 cyclin B1 without effecting the gene expression of cyclin A and cyclin B1 in normal cells.
14. The method of claim 13, wherein the carcinoma cells are colon carcinoma cells.
- 25 15. The method of claim 13, wherein the anthocyanin-rich extract is derived from chokeberries.
16. A method of inhibiting the growth and cell cycle progression of carcinoma cells comprising contacting the carcinoma cells with an anthocyanin-rich extract in an  
30 amount effective to up regulate the gene expression of p21<sup>WAF1</sup> and p27<sup>KIP1</sup> and

down regulate gene expression of cyclin A and cyclin B1 in carcinoma cells, without effecting the gene expression of p21<sup>WAF1</sup> and p27<sup>KIP1</sup> cyclin A and cyclin B1 in normal cells.

- 5     17.     The method of claim 16, wherein the carcinoma cells are cancer carcinoma cells.
18.     The method of claim 16, wherein the anthocyanin-rich extract is derived from chokeberries.
- 10    19.     A method of inhibiting the growth and cell cycle progression of carcinoma cells in a patient comprising administering to a patient a therapeutically effective amount of an anthocyanin-rich extract effective to inhibit the growth and cell cycle progression of carcinoma cells without effecting the growth and cell cycle progression of normal cells in the patient.
- 15    20.     The method of claim 19, wherein the carcinoma cells are colon carcinoma cells.
21.     The method of claim 19, wherein the anthocyanin-rich extract is derived from chokeberries, bilberries, grapes or combinations thereof.
- 20    22.     A method of inhibiting the growth and cell cycle progression of colon carcinoma cells in a patient comprising administering to a patient a therapeutically effective amount of an anthocyanin-rich extract derived from chokeberries capable of causing dual blockage of cell cycle progression at both the G<sub>1</sub>/G<sub>0</sub> and G<sub>2</sub>/M phases of the cell cycle without effecting the cell cycle progression in normal cells.
- 25    23.     A pharmaceutical composition comprising a pharmaceutically acceptable carrier and an anthocyanin-rich extract capable of inhibiting the growth and cell cycle

progression of carcinoma cells in a patient without effecting the growth and cell cycle progression of normal cells in the patient.

24. The pharmaceutical composition of claim 23, wherein the anthocyanin-rich  
5 extract is derived from chokeberries, bilberries, grapes or combinations thereof.
25. A pharmaceutical composition comprising a pharmaceutically acceptable carrier  
and an anthocyanin-rich extract capable of causing dual blockage of cell cycle  
progression at both the G<sub>1</sub>/G<sub>0</sub> and G<sub>2</sub>/M phases of the cell cycle in a patient  
10 without effecting the cell cycle progression in normal cells in the patient.
26. The pharmaceutical composition of claim 25, wherein the anthocyanin-rich  
extract is derived from chokeberries, grapes, billiberries or combinations  
thereof.  
15
27. The pharmaceutical composition of claim 25, wherein the anthocyanin-rich  
extract is derived from chokeberries.